A STUDY OF THE TEMPO PREFERENCES OF FOUR-YEAR-OLD CHILDREN

by

Ellen I. Johnson
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Professor in charge

Committee Members

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ABSTRACT

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The purpose of this study was to determine if four-year-old children prefer music of either a fast or a slow tempo. The sample consisted of 40 four-year-old children, 23 boys and 17 girls, who attend a nursery school with a total 120 population. In each of two sessions administered one week apart, subjects listened to six musical pairs and selected the selections they preferred. Each musical pair consisted of one excerpt played at two tempos, 54 beats per minute and 114 beats per minute. Each excerpt lasted for 20 seconds with a three-second time lapse between the two selections of each musical pair. Subjects indicated their choice of selection either by verbalizing "number one" or "number two", or by raising the appropriate number of fingers which corresponded to their choice of musical tempo.

Both statistical and descriptive data were collected. Results to be drawn from the data are: (1) Subjects as a total group tended to prefer music of a fast tempo over music of a slow tempo; (2) Boys alone did not show a significant preference for music of either tempo; (3) Girls showed a preference for music of a fast tempo in one session but showed no significant preference in the other session; (4) Subjects indicated much preference for music of a fast tempo when it was the most recently heard music, but when music of a slow tempo was the most recently heard they showed no significant preferences during the first session, yet some

significant preference for music of the slow tempo during the second session; (5) When the order of presentation was a fast selection followed by music of a slow tempo, boys showed no significant differences in their choices while girls indicated some preference for the musical selections of a slow tempo; (6) Subjects chose the selection most recently heard in 74 per cent of their responses; (7) Subjects were consistent in their choices in both sessions, regardless of the reversal in the order of presentation, only in 38 per cent of their responses; and (8) Although the musical excerpt most recently heard was generally preferred, subjects chose music of a fast tempo in 73 per cent of their "number one" responses. Children, then, tended to select the song most recently heard, although there were significant preferences for music of a fast tempo over music of a slow tempo.

It is recommended that further study done in this area employ different experimental techniques and consider other influences of music on the preschool child. Positive musical experiences could benefit the child's future learning skills.

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The writer wishes to take this opportunity to express her appreciation to those people who have contributed their time, energy, and cooperation toward the completion of this study. The writer is indebted to her thesis committee, Dr. Genevieve Hargiss, Dr. William Sears, and Dr. Paul Haack; and especially to Dr. Dale Bartlett of Michigan State University, who spent his time and energy in helping to plan the study and in advising and counseling the writer. Thanks are also due Mr. Robert Unkefer, Mrs. Kathryn Blewett, Mrs. Huenstein, Mr. Daryl Foster, other co-workers, friends, and family for their parts in the cooperation, understanding, and support necessary for the completion of this paper.

E.I.J.

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CHAPTER I

INTRODUCTION

The influence of music on human behavior has been studied, observed, and speculated about in numerous aspects and settings throughout recorded history. These influences have been discovered to be both biological in nature and due to the process of acculteration. The knowledge to be gained in this area, as in other areas, is dependent on the methods developed for determining specific response to specific stimuli.

The present study was concerned with the aspect of tempo as it influences the musical preferences of four-year-old children. It is important, therefore, to understand this stage of the child's development and how he is able to conceptualize the world around him. In the chapter on related literature, the writer discusses Piagetian theories of the developmental process.

Preferential response is believed to be related to the individual's familiarity with the stimuli, but it is not altogether understood why different people choose one musical selection over another. According to Lundin:

> there tends to be great similarity in musical taste due to cultural conditioning. There is no evidence that taste is an inherent function of the organism or due to any necessary natural property of the musical stimuli. Musical taste tends to be a fairly stable kind of response. . . .[1]

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[1]Robert W. Lundin. An Objective Psychology of Music, Second Edition. The Ronald Press Company, New York, 1967, pp. 181-182.

Music psychologists, however, have considered various musical aspects such as style, pitch, timbre, meter, tonality, phrasing, melodic contour, and harmonic development and the affective response that is elicited by these characteristics.

This study was an attempt to discover whether four-year-old children prefer music of one tempo to that of another, or whether their stated musical preferences are due to the influence of factors other than that of tempo.

Limitations. The population used in this study was selected because of the writer's familiarity with the nursery school and its staff and because of the willing cooperation of this staff. Due to the limited number of subjects used in this study, it cannot be assumed that the results found herein are typical of all four-year-old populations.

The time factor was somewhat limiting, and the desired resources for purchase of special equipment were not available to the investigator. At the close of this report, recommendations are made as to possibilities for the improvement of procedural techniques using more sophisticated equipment.

Basic Assumptions. A premise upon which this study was based is the belief shared by educators, psychologists, and other investigators that young children do respond behaviorally to musical rhythms. This is certainly apparent in the movement activities of preschool children.

Purpose. This study was directed toward answering the following questions:

1. Is there a difference between four-year-old children's preferences for music of a fast or slow tempo?

2. Is there a difference between the preferences of four-year-old boys and four-year-old girls for music of a fast or slow tempo?
3. Is there a difference between four-year-old children's preferences for fast and slow music based on the order or presentation?
4. Is there a difference between four-year-old boys' and girls' preferences for fast and slow music based on the order of presentation?
5. Is there a tendency for four-year-old children to choose the musical selection most recently heard?
6. Will there be any consistency between choices made by subjects in the first and in the second sessions?
7. Will the subjects tend to prefer music of one tempo over that of another in the musical selections that are presented first?

Need for the Study. Various writers in music therapy and related fields expound on the importance of music and its significance in all cultures. Bergethon and Boardman[2] state that every significant event in man's personal life has an accompanying musical expression. Music seems to be a potent means of portraying and sharing feeling, and it does so in a way that verbalization cannot. In this respect any information about the relationship between man and his music is valuable.

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[2]Bjornar Bergethon and Eunice Boardman. Musical Growth in the Elementary School, Second Edition. Holt, Rinehart, and Winston, New York, 1970, p. 4.

The relationship between emotion and learning has led the writer to believe that educational proponents have a vested interest in learning more in this area. Aronoff[3] claims that education, as it is currently understood, is a process of interrelated cognitive and affective growth that is crucially significant at the pre-kindergarten level. She says further that music and movement are influential in both of these areas and that musical skill is an indicator of such growth.

Search of the literature revealed little mention of the musical preferences of four-year-old children. Related areas do have a significant relationship to this study, however. These related areas include material concerning Piaget's stages of conceptual development, how children think, the nature of musical taste, the musical characteristics of children, and various techniques which have been of value in testing children.

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[3]Frances Weber Aronoff. "Guiding Cognitive and Affective Learning in Pre-Kindergarten Music." Unpublished doctoral dissertation, Columbia University, 1968.

CHAPTER II

RELATED LITERATURE

In order to better understand the development of the four-year-old child, Piaget's developmental stages as interpreted by Maier, are considered. The three major stages are as follows:

1. The sensorimotor stage (roughly, ages 1-2)
2. The period of preparation for conceptual thought (roughly, ages 2-11/12)
3. The stage of cognitive thought (roughly, ages 11 or 12 and up)[1]

The second stage is further divided into the preconceptual, the intuitive thought, and the concrete operations phases. Four- to seven-year-olds are in the intuitive thought phase and it is this phase that is given special attention.

The four- to seven-year-old child has a fairly good command of language and is beginning to use words in his thoughts. His behavior is becoming somewhat consistent, and he will imitate adult behaviors as if he understands what they are all about. His perceptions are still largely those of self-reference, but he is attempting to coordinate these with the perspectives of others who are important to his environment. The child is increasing his adaptive skills, which process Piaget calls assimilation, the individual's manipulation of his environment to himself, and accomodation, the individual's adjustment to his environment as it is. The child of four to seven years does not understand cause and effect, so he generalizes and often makes conclusions which omit many situational considerations.

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[1]Henry W. Maier. Three Theories of Child Development. Revised Edition. Harper and Row, New York, 1969, p. 103.

"Centering," a term used by Piaget, is the concept that the child is able to focus on only one thing at a time. He is unable to classify a series of items.[2] Therefore, in this study, subjects were asked to choose between only two items, and only one aspect of the music, tempo, was varied between the two selections.

Cognitive human behavior, as Piaget conceives it, consists of a combination of four areas: the maturation of the nervous system, experience with the environment, the caring and education that have ensued from experience, and the adaptive growth process.[3] These areas must relate to musical behavior as well, and it is this behavior that the present study explored, as it pertains to the four-year-old child.

Gesell and Ilg cite the following ten skills as being characteristic of the four-year-old child:

1. Increase in voice control with more approximation to correct pitch and rhythm.
2. A few can sing entire songs correctly.
3. More responsive in group singing.
4. Enjoys taking turns at singing alone.
5. Can play simple singing games.
6. High interest in dramatizing songs.
7. Creates songs during play--often teases others on a variation of the minor third.
8. Likes to experiment with instruments, especially combinations of notes on piano.
9. Enjoys identifying melodies.
10. Increased spontaneity in rhythms--likes to demonstrate different ways of interpreting music.[4]

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[2]Maier. op. cit., pp. 125-135.

[3]Ibid., pp. 93-95.

[4]Arnold Gesell and Frances Ilg. Infant and Child in the Culture of Today. Harper and Brothers, New York, 1943, p. 235.

Smith[5] investigated the effects of training on the singing ability of three- and four-year-olds, and concluded that they were able to show significant improvement. Zimmerman[6] adds to this picture of the musical four-year-old by maintaining that they can make accurate judgments concerning relative loudness; and that this may be attributed to their having already mastered the concepts of loud and soft. She states further that pitch and rhythm discrimination are the next to develop, though judgment of sound perception is dependent on the development of memory functioning. Dressler[7] believes that conceptual development in musical learning is dependent on aural perception.

In speaking of rhythmic discrimination, to which the subject of tempo differentiation and preference relates, Zimmerman[8] notes that nursery school children are more adept at coordinating their motions with fast tempos than with slow tempos. McDowell,[9] however, concludes that rhythmic training does not significantly effect the rhythmic

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[5]Robert B. Smith. "The Effect of Group Vocal Training on the Singing Ability of Nursery School Children." Journal of Research in Music Education, 11 (1963) 137-141.

[6]Marilyn P. Zimmerman. Musical Characteristics of Children. Music Educators National Conference, Washington, D.C., 1971, pp. 8-10.

[7]Diane Grace Dressler. "A Music Record Library for Preschool Children." Unpublished doctoral dissertation, Columbia University, 1970.

[8]Zimmerman. op. cit., p. 25.

[9]Robert Harvey McDowell. "The Development and Implementation of a Rhythmic Ability Test Designed for Four-Year-Old Preschool Children." Unpublished doctoral dissertation, University of North Carolina at Greensboro, 1974.

ability of four-year-olds. Shuter[10] discusses various authors who differ as to whether rhythmic or melodic skills develop first, or even independently. The idea that there are biological reasons for rhythmic development between the ages of two and four seems to be substantiated by numerous observers. Based on the observation that children do respond behaviorally to rhythmic music of faster tempos, it was the intent of the present study to discover whether tempo is a factor in preferred music listening.

How and why people differ as to their musical preferences is not altogether understood, but various authors have written on the subject. Musical taste, as defined by Farnsworth, is "the overall attitudinal set one has toward the phenomena which collectively comprise music."[11] Both Farnsworth[12] and Mueller[13] propose that musical taste is a feature culturally inherited from the past. Rubin-Rabson[14] concludes that age has the most significant influence on musical taste, although intelligence does to a lesser degree, and

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[10]Rosamund Shuter. The Psychology of Musical Ability. Methuen and Company Ltd., London, 1968, pp. 74-76.

[11]Paul R. Farnsworth. The Social Psychology of Music. The Iowa State University Press, 1969, p. 97.

[12]Ibid. p. 99.

[13]John H. Mueller. The American Symphony Orchestra. Indiana University Press, Bloomington, 1951, p. 395.

[14]Grace Rubin-Rabson. "The Influence of Age, Intelligence, and Training on Reactions to Classic and Modern Music." The Journal of General Psychology, 12 (1940) 413-429.

musical training does only in response to modern music. Erneston,[15] in his experiment with young adults, maintains there is a strong relationship between musical experience and acquired musical taste. He did not find any particular type of musical activity leading to a higher level of acquired taste, but he did find that the length of time spent in musical participation and high mental ability both contribute positively to taste formulation.

Musical taste, when included with appreciations, attitudes, interests, and learning, is part of affective development. Zimmerman[16] points out that it is the outcome of conditioning and education. She also notes that little research in this area has involved young children, as most has been concerned with adolescents. Aesthetic discrimination among preschoolers, however, was discovered by Daniels[17] when he experimented with balance in a tri-dimensional design procedure. Mursell,[18] in writing about musical listening, suggests that the mood of the listener is the most significant factor when preparing for a total musical enjoyment.

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[15]Nicholas Erneston. "A Study to Determine the Effect of Musical Experience and Mental Ability on the Formulation of Musical Taste." Unpublished doctoral dissertation, Florida State University, 1961.

[16]Zimmerman. op. cit., pp. 21-23.

[17]Parmely Clark Daniels. "Discrimination of Compositional Balance at the Preschool Level." Psychological Monographs, 45 (1933-1934) 1-10.

[18]James L. Mursell. The Psychology of Music, W. W. Norton & Company, Inc., New York, 1937, pp. 205-207.

Russell's[19] concept of associative thinking, as differentiated from creative thinking, problem solving, and learning theory, seems to be closely related to the processes utilized in the appreciation and perception of music. Russell discusses the child and states that thinking is based on his experience, his percepts of them, his images and memories, as well as his emotional influences. Emotions and attitudes are an important part of thinking and all attitudes [an example of which is musical preference] contain emotional and knowledge factors. Russell believes that emotions are one source of thinking and that associative thinking is characterized by the use of past experience and involves much sequential patterning. He further states that associative thinking relates to the use and application of what has been learned.

Organic conditions, biological needs, and purposes have a large place in associative thinking, according to Russell.[20] These factors may also influence how individuals respond to music listening. Both children and adults select out of a complex environment those items that may have value in reducing the tension associated with emotional states. Children's daydreams and fantasies are included in these behaviors.[21]

Shuter[22] has demonstrated a high correlation between interest

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[19]David H. Russell. Children's Thinking. Blaisdell Publishing Company, Waltham, Massachusetts, 1956, pp. 198-217.

[20]Ibid.

[21]Ibid.

[22]Shuter. op. cit., pp. 192-194.

in music and criteria used for measuring musical ability. Musical ability, then, may be related to musical preference. Wing[23] asserts that interest arises from ability and not vice versa. He says further that hearing music at home affects interest but not ability to do tests. Kirkpatrick[24] found strong relationships between singing ability and musical environment at home. Belief is widespread that genetic factors contribute to musical ability. Shuter[25] believes that technical as well as emotional aspects of creative faculties can be partly inborn. Zimmerman[26] describes a study by Horner in which musical aptitudes were reported to be manifested between the ages of two and four in half of 441 cases tested, and that critical periods are the sixth year, when greater concentration is possible, and from the ninth to the twelfth years when technical facility and mental concentration can be developed. Shuter[27] believes musical ability to be more clearly linked with intelligence than genetic factors. Shuter[28] and Wing[29] agree, however, that generally speaking, with the

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[23]Herbert Wing. Tests of Musical Ability and Appreciation. Second Edition. The University Press, Cambridge, 1968, pp. 79-82.

[24]William Coy Kirkpatrick. "Relationships Between the Singing Ability of Prekindergarten Children and Their Home Musical Environment." Unpublished doctoral dissertation, University of Southern California, 1962.

[25]Shuter. op. cit., p. 174.

[26]Zimmerman. op. cit., p. 27.

[27]Shuter. op. cit., pp. 126-128.

[28]Ibid., p. 228.

[29]Wing. op. cit., p. 65.

exception of a few documented cases, a low intelligence quotient indicates a low musical quotient; but a high intelligence quotient does not indicate a high musical quotient. Shuter[30] further proposes that musical ability is largely specific, and that dexterity and the memory span factor may be related.

Auditory acuity has an effect on musical ability. The primary projection area for auditory messages reaching the brain is located in the temporal lobes of the cortex. Speech is bilateral with the left side being dominant; the right side is dominant in non-verbal functions, such as musical activity. In understanding the physiological correlates of musical ability, it is important to note that earlier learning is better preserved and in cases of localized brain injuries, musical ability has been preserved when speech functions have been destroyed. With any learning the nervous system is altered, leaving an imprint called an engram. The better remembered musical experiences have been, the more readily familiar elements in a new pattern of notes can be assimilated. Therefore, ability involves memory and also the skill and judgment to relate tones in a meaningful way and to make comparisons and discriminations. Another physiological correlate of musical ability is the muscular system, and this effects not only performance but perception.[31]

The reader must be aware, at this point, of the problems inherent in research with pre-school children because of their difficulty in relating information. This difficulty, says

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[30]Shuter. op. cit., pp. 232-236.

[31]Ibid., pp. 195-213.

Zimmerman,[32] occurs because measurement requires the child to express his responses verbally or manipulatively. In her study, several hundred of these responses pointed to a tendency for young children to read a vague meaning into a purely auditory stimuli. She suggests, and Bergethon and Boardman[33] agree, that the use of visual cues is helpful in eliciting the child's response in comparative tasks. Since the measurement concept is more developed in pre-school children than their vocabulary, manipulative and overt measures have numerous possibilities in testing. For this reason, a visual representation of the number of the selection being played was used in the present study.

Petzold and Wing, in reporting various research methods they have developed in order to elicit the musical responses of children, have provided useful clues in setting up the procedure used in this study. Wing[34] believes it is more advantageous in testing children to use only short excerpts and to present a choice of only two selections. He discovered that if the pause between two selections is too short, it confuses children; if the pause is too long, they become distracted. A time element of three seconds, therefore, was finally selected. Using two sets of records, he prepared the items in reverse order, so that validity of response

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[32]Zimmerman. op. cit., pp. 6-11, p. 21.

[33]Bjornar Bergethon and Eunice Boardman. Musical Growth in the Elementary School, Second Edition. Holt, Rinehart, and Winston, New York, 1970, p. 15.

[34]Wing. op. cit., pp. 23-40.

might be improved. Petzold[35] discovered comparatively few studies concerning musical responses of children of elementary school age. In his study of auditory perceptions, he found that a tempo of 90 beats per minute was too slow to hold the child's interest; he increased the speed, therefore, to 120 beats per minute.

Although various aspects of the methods mentioned above are helpful, Lewis[36] concludes that the experience and skill of the tester is a primary factor in the use of any experimental instrument.

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[35]Robert G. Petzold. Auditory Perception of Musical Sounds by Children in the First Six Grades. Cooperative Research Project N. 766. University of Wisconsin, Madison, 1966, p. 20.

[36]Rebecca Gail McCormick Lewis. "The Development and Validation of an Instrument Based on Viktor Lowenfeld's Developmental Stages in Art for Determining Social, Emotional, Physical, Creative and Intellectual Growth of Five Year Old Children." Unpublished doctoral dissertation, University of Mississippi, 1972.

CHAPTER III

EXPERIMENTAL DESIGN

Subjects. The subjects selected for this experiment were 40 four-year-old children, 23 boys and 17 girls, who attend a nursery school facility in which 75 per cent of the children came from one-parent families. [See Appendix A for age distribution of children according to month.] The school enrollment is 120 children, ranging in age from two and one-half years to six years of age. The school receives partial support from United Fund and the children come from families whose financial background ranges from those who receive public assistance to those for whom both parents are professionals. Fees are based on the ability to pay. The racial and ethnic backgrounds of the children are also quite varied.

Materials. The following materials were used in collecting the data used in this experiment:

1. One Sony cassette tape recorder, TC-110.
2. One cassette, C-90, plus two tapes.
3. One Elburn console piano used in recording.
4. Two books from which taped selections were chosen: John Thompson's Modern Course For the Piano: The First Grade Book, The Willis Music Co., Cincinnati; and Exploring Music: Kindergarten by Eunice Boardman and Beth Landis, Holt, Rinehart, and Winston, Inc., New York, 1969. [Specific selections used are listed in Appendix B.]

5. One Seth Thomas metronome.

6. One stop watch used in recording the length of musical selections.

Setting. The setting for this experiment was a small room on the first floor of the nursery school building. This room, containing a long table, chairs, a file cabinet, and a trunk, is ordinarily used for board meetings. The tape recorder was set up at one end of the table, and chairs were made available to both the examiner and the subjects. Located on the extreme end of the first floor, the room, although not acoustically sound, was quite isolated from the children's classrooms, most of which are on the second floor. Occasional late arrivals entering through the side door were the only intrusive sounds.

Pilot Studies. In order to determine the best possible procedure for obtaining data, two pilot studies were done. Using a table of random numbers, a selection of 10 subjects, five boys and five girls, was made from an approximate four-year-old nursery school population of 40 children. Although this was the same nursery school where the subjects for the main study were selected, none of the subjects used in Pilot Study No. 1 were used in the main study.

The children in this pilot study were asked to listen to a taped recording of 10 paired musical selections and to choose which excerpt in each of the pairs they liked the best. The musical selections were all nonvocal and were taped from records representing

a variety of musical styles, such as classical music, jazz, and semi-popular music. By taking each pair of excerpts from the same record, the musical pairs were matched as to style of music and orchestration of the performing group recording the music. The tempo was greatly varied in eight of the ten pairs. All music was intended to be unfamiliar to the subjects. Each musical excerpt was 45 seconds in length and these excerpts were separated by 15-second time lapses. While testing the first two subjects, it seemed that the concepts of "first" and "second" or "first" and "last" were not sufficiently understood, so that answers thereafter were indicated by having the subjects choose between "number one" and "number two". Because some of the children were reluctant to verbalize their answers initially, it proved to be quite helpful to designate the playing of each selection by a continual upraised finger or fingers as indication of whether selection number one or number two was currently being played. Some of the children responded verbally and some indicated their choices by a corresponding show of one or two fingers. Some subjects used both methods, either simultaneously or interchangeably.

This listening experience was repeated one day later, with the order of each of the musical pairs reversed. The subjects were asked again to choose the selections from each pair that they preferred, and again all responses were recorded on paper.

From this piloting, it appeared that the majority of the children became quite restless after listening to the sixth musical pair, and that 45-second musical excerpts and 15-second time lapses were unnecessarily long and contributed to the increase of

distractibility. During the second session, the subjects seemed overly comfortable with the examiner and tended to exhibit varying degrees of playfulness which interfered with their ability to attend to the music, and which also created a difference between the first and second sessions. In addition, during this second session, they were aware of the fact that they were to receive a candy treat at the close of the session; this may have altered their response to the examiner and to the task at hand.

In order to decrease the possibility of subjects responding to variables other than tempo, such as preference for instrumental medium or melody, it was decided that further piloting would be done to assess the productiveness of using only piano music. The music would be played by the examiner and the degree of contrasting tempos thereby controlled. Simple but unfamiliar children's music and beginning piano music would be used in order that preference for style would not influence responses. By using simple harmonic backgrounds, it was believed that the subjects would not be as likely to become distracted by the complexity of more classical selections. Influenced by the previous piloting, musical excerpts would be limited to 35 seconds, with only a three-second time lapse between selections. Only six musical pairs would be played and subjects would be asked to respond in the same manner as was done in the first pilot study.

The subjects selected for Pilot Study No. 2 were nine four-year-old children attending a pre-kindergarten classroom. These subjects were chosen after a testing procedure in which it was

determined that they could benefit from such special exposure and experiences before entering kindergarten classes. All nine subjects were boys in this particular classroom. These subjects also differed from the first sampling of subjects because they had had no prior experience in being asked to participate in an experiment of any kind. Being taken from the classroom setting had previously connotated getting shots or having experiences that had not been pleasant. Many were fearful, therefore, or at least anxious about going with the investigator. For this second piloting, however, only one session was conducted.

Procedure. In order to reduce variable factors between the first and second sessions, the examiner implemented an orientation session in which no data was gathered. The subjects were divided into five groups and given the opportunity to meet the examiner, to ask questions about the tape recorder and the piano music and to learn about what was being asked of them. They were told that they were being asked to help the investigator learn more about four-year-olds and the music they liked, and that, when finished, everyone would get a special treat. Learning the procedure together and understanding the concepts used in the experiment was facilitated by their familiarity with each other and their sharing the experience.

The regularly scheduled sessions took place in the mornings of three consecutive days. The children were called individually from their respective groups and asked to go with the examiner to the testing room. Once in the room, each subject was asked to recall the previous session and to repeat the procedure as they remembered

it. Reinstatement of the procedure was given when it seemed necessary.

The tape recording used for this experiment consisted of six pairs of musical excerpts. Based on the experience of the second pilot study, it was decided that each excerpt would be 20 seconds long and the time lapse between excerpts would be three seconds. The average moderato tempo is about 84 beats per minute. In order to provide a contrast, therefore, all slow selections were played at 54 beats per minute, or 30 beats per minute less than average moderato tempo; and all fast selections were played at 114 beats per minute, or 30 beats per minute more than average moderato tempo. Each musical pair consisted of the same selection played at the two different tempos. While playing each pair, the examiner held up one or two fingers to indicate which excerpt was being played. Following the playing of each musical pair, the children were asked which musical selection they liked better. Subjects responded verbally or by raising the number of fingers corresponding to their choice of musical selection. Responses were then recorded on paper, as were the examiner's impressions of each subject's responses. [See Appendix C for the raw data.]

One week later the same procedure was repeated with the same 40 children. In this session, the order of each musical pair was reversed, and subjects were again asked to choose the selection they preferred by a show of fingers or by verbalization of their responses. Responses were again recorded during the session. Candy treats were given to all subjects the day following the completion of each session.

Statistical Treatment of the Data. The chi-square one-sample test was used to accept or reject the following null hypotheses:

1. There will be no difference between four-year-old children's preferences for music of a fast or slow tempo.
2. There will be no difference between the preferences of four-year-old boys and four-year-old girls for music of a fast or slow tempo.
3. There will be no difference between four-year-old children's preferences for fast and slow music based on the order of presentation.
4. There will be no difference between four-year-old boys' and girls' preferences for fast and slow music based on the order of presentation.

CHAPTER IV

RESULTS, CONCLUSIONS, AND SUMMARY

Results

A chi-square test was chosen because the hypotheses to be tested concerns the comparison of observed and expected frequencies in discrete categories. The results are presented under the subheadings of the four null hypotheses which were tested in this study:

Null Hypothesis One. The sample of 40 children listened to six paired selections and made 240 responses during each of two sessions. Therefore, the expected frequency of response is 120 subjects choosing music of a fast tempo, and 120 subjects choosing music of a slow tempo. Table 1 shows the comparison of observed (O) and expected (E) frequencies, the chi-square value (X^2) and corresponding levels of significance.

TABLE 1

COMPARISON OF FAST AND SLOW TEMPO PREFERENCES, CORRESPONDING X^2 VALUES, AND LEVELS OF SIGNIFICANCE

		f	s	x^2
1st session	O	153	87	9.08***
	E	120	120	
2nd session	O	146	94	5.63**
	E	120	120	

*** significant at the .01 level
** significant at the .02 level

For the first session, the chi-square value exceeds the .01 level of significance and is, therefore, within the region for rejection of the null hypothesis. The chi-square value for the second session exceeds the .02 level of significance, so is also within the region for rejection of the null hypothesis.

Null Hypothesis Two. The population studied consisted of 23 boys and 17 girls. In listening to six musical pairs, boys gave 138 responses and girls gave 102 responses. With no difference expected between those selecting fast and slow tempos, the expected frequency of responses for boys is 69 and that for girls is 51. Tables 2 and 3 indicate the comparison of observed and expected frequencies.

During the first session and second session, as indicated in Table 2, the observed chi-square values were not significant for boys' responses. Therefore, null hypothesis two will not be rejected for either session for boys.

TABLE 2

COMPARISON OF FAST AND SLOW TEMPO PREFERENCES FOR BOYS, X^2 VALUES AND LEVELS OF SIGNIFICANCE

		f	s	x^2
1st session	O	83	55	2.84
	E	69	69	
2nd session	O	85	53	3.71
	E	69	69	

TABLE 3

COMPARISON OF FAST AND SLOW TEMPO PREFERENCES FOR GIRLS, X^2 VALUES AND LEVELS OF SIGNIFICANCE

		f	s	x^2
1st session	0	68	34	7.08***
	E	51	51	
2nd session	0	61	41	1.96
	E	51	51	

*** significant at the .01 level

In the first session with girls, the chi-square value exceeded the .01 level of significance and is, therefore, within the region for rejection of the null hypothesis. In the second session, however, the observed chi-square value was not significant. Therefore, a null hypothesis cannot be rejected for this second session with girls.

Null Hypothesis Three. The order of presentation of slow and fast music differed among the six musical pairs that were played. In each session, three pairs were presented in the slow-fast order, and three pairs were presented in the fast-slow order. Therefore, during each session, 40 subjects gave 120 responses to music of the slow-fast order and 120 responses to music of the fast-slow order. In each category then, the expected frequency would be 60 choices for the fast tempo and 60 choices for the slow tempo. Table 4 indicates the comparison of observed and expected frequencies in each order of presentation.

TABLE 4

COMPARISON OF FAST AND SLOW TEMPO PREFERENCE IN OPPOSITE ORDERS OF PRESENTATION, X^2 VALUES AND LEVELS OF SIGNIFICANCE

		f	s	x^2
1st session	0 slow-fast	104	16	32.27****
	E slow-fast	60	60	
	0 fast-slow	49	71	2.02
	E fast-slow	60	60	
2nd session	0 slow-fast	102	18	29.40****
	E slow-fast	60	60	
	0 fast-slow	44	76	4.27*
	E fast-slow	60	60	

**** significant at the .001 level
* significant at the .05 level

When the musical pairs were presented with the slow selection first and the fast selection last, in the first and second sessions, the observed chi-square value exceeded the .001 level of significance and was, therefore, within the region for rejection of a null hypothesis. When the reverse order of a fast selection followed by a slow selection was presented, the observed chi-square value was not significant during the first session, hence, the null hypothesis was not rejected. During the second session, however, the level of significance was greater than the .05 level, so the null hypothesis was rejected.

Null Hypothesis Four. In order to maintain a larger sampling, data for both sessions was added together in determining whether or not boys and girls select fast and slow tempos at the same frequency, regardless of the order in which the tempos are presented. Hence, boys have 138 responses in each category and girls have 102 responses in each category. The expected frequency of response in each order of tempo presentation would be, then, 69 responses for fast tempo and 69 responses for slow tempo for the boys; and, 51 responses for fast and 51 responses for slow tempo for the girls. Tables 5 and 6 indicate the comparison of observed and expected frequencies for both boys and girls.

TABLE 5

COMPARISON OF BOYS' FAST AND SLOW TEMPO PREFERENCE IN OPPOSITE ORDERS OF PRESENTATION, X^2 VALUES AND LEVELS OF SIGNIFICANCE

	f	s	x^2
O slow-fast	119	19	36.23****
E slow-fast	69	69	
O fast-slow	49	89	5.80**
E fast-slow	69	69	

**** significant to the .001 level
** significant to the .02 level

TABLE 6

COMPARISON OF GIRLS' FAST AND SLOW TEMPO PREFERENCE IN OPPOSITE ORDERS OF PRESENTATION, X VALUES AND LEVELS OF SIGNIFICANCE

	f	s	x
O slow-fast	87	15	25.41****
E slow-fast	51	51	
O fast-slow	44	58	1.96
E fast-slow	51	51	

**** significant to the .001 level

When musical pairs were presented with the slow selection followed by the fast selection, both boys and girls showed a significant preference for fast tempo. The observed chi-square value of difference for both was significant at the .001 level, which is within the region for rejection of the null hypothesis. However, when the order of presentation is reversed, boys show an observed chi-square value of difference, significant at the .02 level, thus rejecting the null hypothesis; but, girls show no significant difference in their choice of fast or slow tempo when the order of tempo presentation is from fast to slow, so the null hypothesis cannot be rejected.

Descriptive Statements. The first of the seven research questions to be answered is: Is there a difference between four-year-old children's preferences for music of a fast or slow tempo? Forty children listened to six musical pairs and gave 240 responses in

each of two sessions. There were 153 choices for music of the fast tempo and 87 choices for music of the slow tempo in the first session. In the second session there were 146 choices for music of the fast tempo and 94 choices for music of the slow tempo. The number of preferences for music of a fast tempo significantly exceeded the number of preferences for a slow tempo in each of the two listening sessions.

Is there a difference between the preferences of four-year-old boys and four-year-old girls for music of a fast or slow tempo? Twenty-three boys gave 138 responses in each of two listening sessions. In the first session they chose 83 fast selections and 55 slow selections; in the second session, boys chose 85 fast selections and 53 slow selections. Although boys did choose more fast selections, the difference in their choice of music of fast and slow tempo in both sessions was not significant. Seventeen girls gave 102 responses in each of two listening sessions. In the first session they chose 68 fast selections and 34 slow selections; in the second session, girls chose 61 fast selections and 41 slow selections. Choices for music of a fast tempo exceeded those for music of a slow tempo. Differences were more significant in the first than in the second session, however.

Is there a difference between four-year-old children's preferences for fast and slow music based on the order of presentation? During the first session, when a slow selection was followed by a fast selection, there were 104 fast choices and

16 slow choices. During the second session there were 102 fast choices and 18 slow choices. When the order of presentation was reversed, there were 49 fast choices and 71 slow choices in the first session, and 44 fast choices and 76 slow choices in the second session. When the fast music was the most recently heard, subjects did show a preference for the fast tempo over the slow tempo in both sessions. When the fast tempo preceeded the slow tempo, however, subjects showed no marked preference for music of either tempo during the first session; during the second session there was a significant preference for music of a slow tempo.

Is there a difference between four-year-old boys' and girls' preferences for fast and slow music based on the order of presentation? When fast music was the most recently heard, boys selected 119 fast selections and 19 slow selections during two sessions of listening. When the order of presentation was reversed, boys selected 49 fast selections and 89 slow selections. Girls selected 87 fast selections and 15 slow selections when the fast music was the most recently heard. When the order was reversed, they selected 44 fast selections and 58 slow selections. Both boys and girls selected fast music when it was the most recently heard, but only boys showed a significant difference in their choice of tempo in choosing more slow selections than fast selections.

Is there a tendency for four-year-old children to make more "number two" choices? For the 240 responses given in each

session, 175 were number two choices in the first session, or 73 per cent; and 178 were number two choices in the second session, or 74 per cent of the total number of possible responses. Boys responded with 75 per cent number two choices during both sessions, and girls gave 70 per cent number two choices in the first session and 73 per cent during the second session. When totaled, subjects chose the most recently heard selection in 74 per cent of their responses.

Will there be any consistency between choices made by subjects in the first and in the second sessions? Consistency in the choice of the same musical selection in both sessions, regardless of the reversal in the order of presentation is 38 per cent for the total group of subjects. Boys chose the same selection in both sessions in 35 per cent of their responses, and girls chose the same tempo in 42 per cent of their responses. Four-year-old subjects did not have a high rate of consistency in their responses between the two session.

Finally, as subjects gave a majority of number two responses; Will the subjects tend to prefer music of one tempo over that of another in their "number one" choices? Subjects chose number one 65 times in the first session and 62 times in the second session. Of the 65 number one responses in the first session, 49, or 75 per cent, were fast tempo choices and 16, or 25 per cent, were slow tempo choices. Of the 62 number one responses in the second session, 44, or 71 per cent were fast tempo choices, and 18, or 29 per cent were slow tempo choices. Although number two choices were preferred, subjects chose more fast tempos in their number one choices.

Conclusions

Both objective and subjective data were used in formulating conclusions in this study. Observable, but non-measurable data, as well as informative statements not included in the results, were helpful. Subjects nos. 9, 18, 21, 28, 29, and 32 were not present for the orientation session but participated in both data-collecting sessions. [See Appendix C for each subject's responses.] They did not seem to have difficulty in understanding what was expected of them. Subjects nos. 11, 14, 21, 24, and 27 gave the same response after each musical pair in both sessions. Subjects nos. 1 and 28 gave the same response to all pairs in the first session but not in the second session. Subjects nos. 10, 13, and 33 gave the same response to all pairs in the second session, but not during the first session. Subjects nos. 10 and 36 chose alternate responses during the second sessions only. For those subjects who gave identical responses, all were number two choices. There were seven fewer choices for fast tempo for the second session than for the first; however, the boys' fast tempo choices increased by two, and the girls' fast tempo choices decreased by nine.

Although there was a wide variety among the children as to temperament and personality characteristics, the children who seemed reluctant to differ their responses were those who seemed most anxious about their participation in the study. They appeared eager to please the examiner and concerned about their behavior being "right". Various subjects seemed quite alert and verbal about what they were doing, and also indicated to the examiner

the nature of their musical exposure. A few subjects kept time while the music was playing. Whether or not each subject was attending to the music, and whether or not they were responsive to the examiner and the task at hand seemed apparent to the examiner in most cases.

The conclusions to be drawn from the data are:

1. Subjects as a total group tended to prefer music of a fast tempo over music of a slow tempo.
2. Boys did not tend to prefer music of either tempo.
3. Girls preferred music of a fast tempo during one session but not in the other session.
4. Subjects preferred music of a fast tempo when it was the most recently heard music. When music of a slow tempo was the most recently heard, they showed no preference during the first session, yet indicated a preference for music of a fast tempo during the second session.
5. Boys preferred music of a fast tempo, regardless of the order of presentation.
6. Girls preferred music of a fast tempo when the order of presentation was slow to fast, but when the order was reversed, they did not indicate a preference for music of either fast or slow tempo.

Statistical differences between data for the total group and those for boys and girls as separate groups may be to the differences of the population numbers.

Implications. Results seem to indicate that the four-year-old child still has some difficulty in focusing on more than one item in his environment at a time. The task given to the child in this study demanded that some memory skill be active, and although it was apparent that the majority of subjects had some ability in this area, it was still a difficult requirement, in that the most recently heard music was fresh in their minds when a comparison had to be made. Although the order of presentation seemed to be the most influential factor in determining the child's musical preferences, the subjects did tend to prefer music of a fast tempo over that of a slow tempo.

Another variable, which was not dealt with in this study but which would provide ample material for other studies, is the influence of parental figures and the home environment. For example, one subject, who indicated knowledge of rhythms, was taking dancing lessons. Some children are encouraged to be responsive to a greater degree than are others. Parents are quite influential in determining their children's behaviors, including musical behaviors.

Maturation, musical ability, intelligence, and genetic make-up are also present as variables which affect the musical preferences of four-year-old children. To a certain extent, some of these variables were observable in the subjects' behavior during the individual testing sessions.

Recommendations for Further Study. As mentioned earlier, it can be difficult for the four-year-old to make aural comparisons because

this involves memory skill and ability to perceive some meaning in sounds as they are heard. If two sound booths could be constructed for piped-in music of fast and slow tempi, the subjects could then alternate between the booths until able to choose which musical tempo they preferred. Subjects could be tested individually, and the number of choices they need make each session could be very limited, although, over a longer period of time, many more selections would have been made. A larger population, also, would allow for more valid results. Perhaps the musical selections might be written specifically for the experiment. In this way there would be less doubt as to whether or not the music being played was faster or slower than generally judged to be appropriate. Also, four-year-olds seem to be less anxious about making decisions when the adult is not so acutely present and the decision-making time is less limited.

As music is closely associated with feelings, and emotions affect learning, the influences of music upon very young children can be significant. Certainly, further study of various aspects of these influences would be enlightening and profitable.

Summary

Musical preference has been a concern of authors, but a search of the literature revealed little about the preschool child and the aspects of music which affect his preferences. The related areas that were discussed were: Piagetian theory on child development as it pertains to the four-year-old, the musical characteristics of the four-year-old, some processes associated

with musical perception, children's thinking, the musical ability of children and various techniques which have been of value in eliciting responses from children.

The subjects selected for this study were 23 boys and 17 girls who were in regular attendance at a nursery school. The study was conducted in a small room of this same nursery school. Each of six musical pairs consisted of the same piano piece, played once at a tempo of 114 beats per minute, and played a second time at 54 beats per minute. The slow and fast tempi were played in various orders of presentation during the first session, and these orders were reversed during the second session. So that each subject listened to the same music presented in the same manner, the piano selections were taped. Simple pieces were used so that more complex melodic and harmonic backgrounds would not interfere with the subjects' being able to attend to the variable of tempo. Subjects were asked to listen to each musical pair and then choose the selection they liked the best. In order to aid subjects in their task, a visual cue was used during the listening time. The examiner would keep upraised one or two fingers to indicate the number of the selection being played. Subjects either verbalized their choices or indicated their choice with a corresponding show of fingers. All responses were recorded on paper for both sessions.

Results indicated that the number of preferences for music of a fast tempo significantly exceeded the number of preferences for music of a slow tempo in each of the two listening sessions. Boys, however, showed fewer significant differences than did girls. When the order of presentation was a slow selection followed by a fast

selection, the fast selection choices were generally preferred. When this order was reversed, slow selection choices somewhat exceeded fast selection choices. Boys' choices for music of a slow tempo tended to exceed the girls' choices when this was the most recently heard music. Although there were differences in results for the entire population as opposed to those for boys and girls, it would seem that the order of presentation is more influential in choosing tempo preferences than is the tempo itself. Children tend to select the song most recently heard. However, results do indicate some preference for music of a fast tempo over that for music of a slow tempo.

Further study needs to be done in this area using different experimental techniques, and also studying other aspects of musical influence in the preschool child. As music is associated with feelings and can bring about enjoyable experiences, these influences upon the very young can be significant in their effect upon learning skills.

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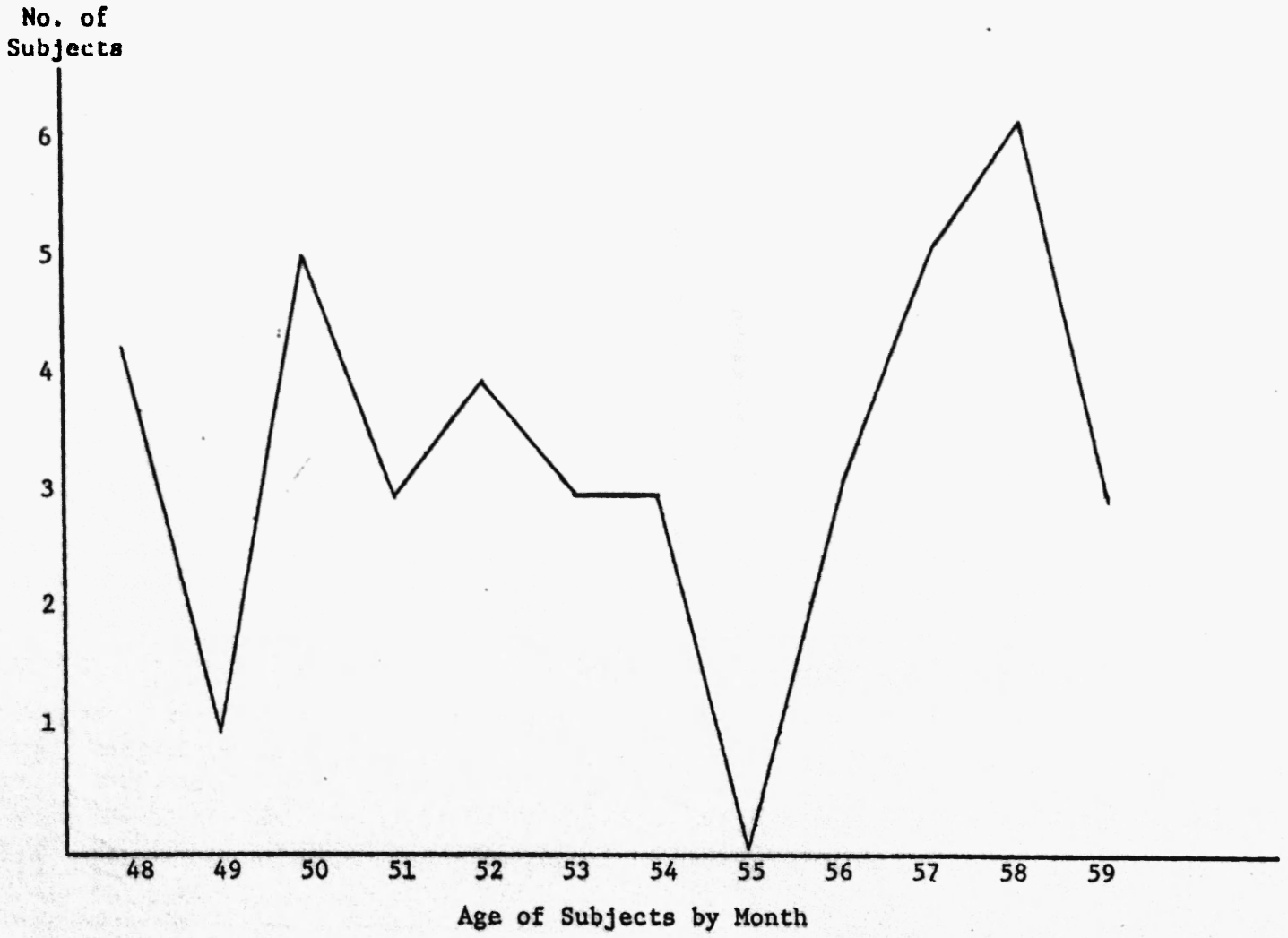
APPENDIXES

APPENDIX A

Graph Showing Distribution of Age of Subjects by Month

GRAPH SHOWING AGE DISTRIBUTION OF SUBJECTS BY MONTH



APPENDIX B

Musical Selections Used

MUSICAL SELECTIONS USED

Selection No.	Title of Selection	Source Book	Page
1	The Tiresome Woodpecker	John Thompson's First Grade Book	40
2	Lightly Row	John Thompson's First Grade Book	33
3	It's A Pumpkin	Exploring Music, Kindergarten	142
4	The Owl's Question	John Thompson's First Grade Book	45
5	The Leaves' Party	Exploring Music, Kindergarten	62
6	Falling Leaves	John Thompson's First Grade Book	36

APPENDIX C

Table of Responses, From Youngest to Oldest Subject
For Six Paired Musical Selections and Two Sessions

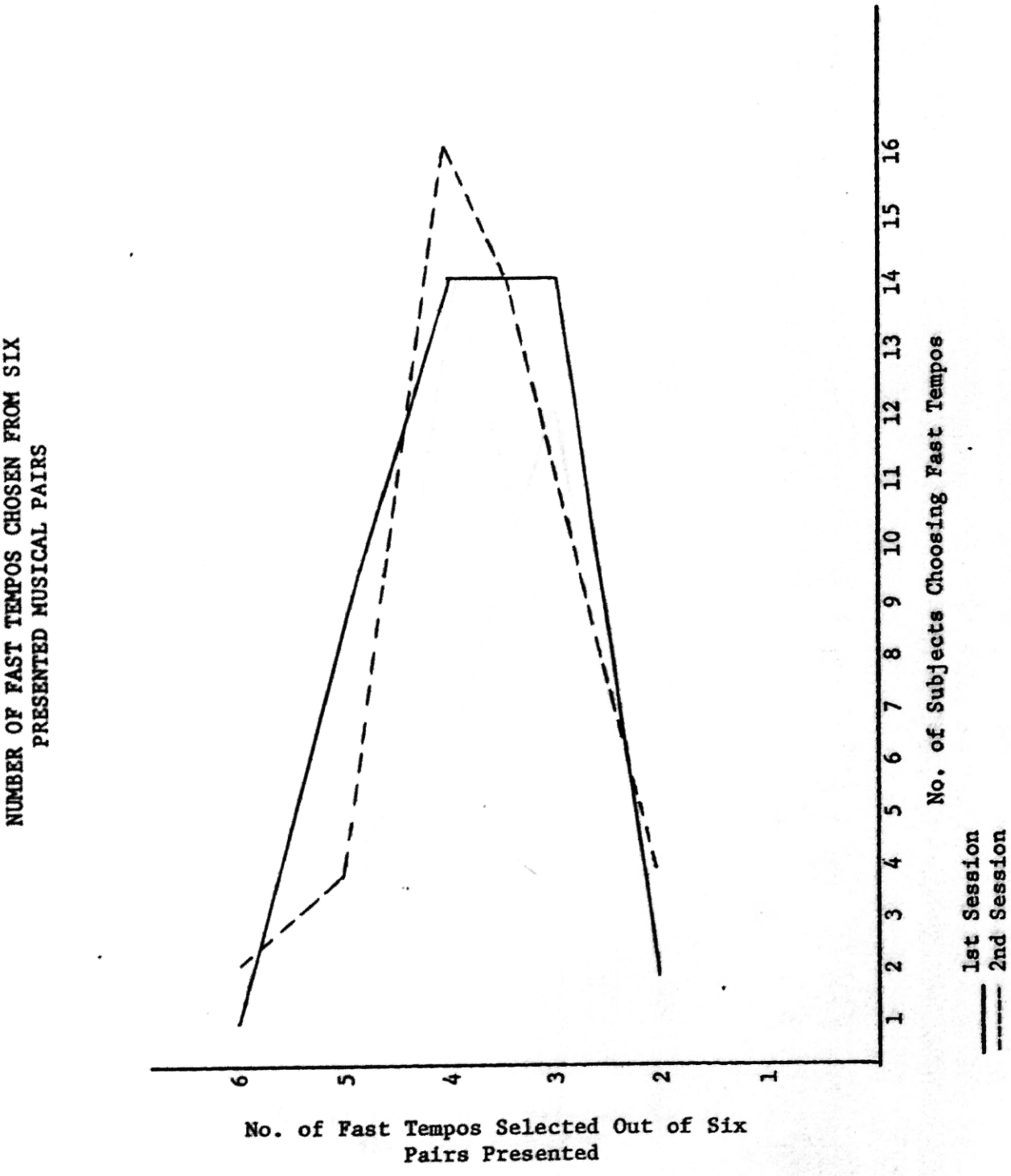
TABLE OF RESPONSES FROM YOUNGEST TO OLDEST SUBJECT
FOR SIX PAIRED MUSICAL SELECTIONS
AND TWO SESSIONS

	First Session							Second Session						
	fast-slow	slow-fast	fast-slow	fast-slow	slow-fast	slow-fast		slow-fast	fast-slow	slow-fast	slow-fast	fast-slow	fast-slow	
Subject No.														
*1.	2	2	2	2	2	2		1	2	2	2	2	2	
*2.	1	1	1	1	2	2		1	2	2	2	2	1	
3.	2	2	1	2	2	2		2	1	2	2	2	2	
*4.	1	2	2	1	2	2		1	2	2	2	1	2	
*5	2	2	2	1	2	2		2	1	2	1	2	2	
*6.	1	1	1	2	2	2		1	2	2	2	2	2	
7.	2	1	2	1	2	2		2	1	2	2	2	2	
8.	2	2	1	1	2	1		2	2	1	2	1	1	
*9.	2	2	2	1	2	1		2	1	2	2	2	2	
*10.	1	2	2	2	2	2		2	2	2	2	2	2	
11.	2	2	2	2	2	2		2	2	2	2	2	2	
*12.	2	2	2	1	2	2		2	2	2	2	1	1	
13.	2	1	2	1	2	1		2	2	2	2	2	2	
14.	2	2	2	2	2	2		2	2	2	2	2	2	
15.	2	2	1	2	2	2		2	1	2	2	2	2	
16.	2	1	1	1	2	1		1	1	2	1	1	2	
17.	2	2	1	1	2	1		2	2	2	2	1	2	
18.	2	2	2	1	1	2		2	1	2	1	1	1	
*19.	2	2	2	1	2	1		2	1	2	1	2	2	
*20.	1	1	1	1	2	2		2	1	2	2	1	1	
21.	2	2	2	2	2	2		2	2	2	2	2	2	
22.	2	2	2	1	2	2		1	2	2	2	1	1	
*23.	1	2	1	2	2	2		2	1	2	2	1	1	
24.	2	2	2	2	2	2		2	2	2	2	2	2	
*25.	2	2	2	1	2	2		2	1	2	2	2	2	
*26.	1	2	2	2	2	2		2	1	2	2	2	1	
27.	2	2	2	2	2	2		2	2	2	2	2	2	
28.	2	2	2	2	2	2		2	1	2	2	2	2	
29.	1	2	1	2	2	2		2	2	2	2	1	2	
30.	2	2	1	1	2	2		1	2	2	2	1	1	
*31.	1	2	2	1	2	2		2	2	2	2	1	1	
*32	2	2	2	2	1	2		2	2	1	1	1	2	
*33.	1	2	2	2	2	2		2	2	2	2	2	2	
34.	1	2	2	1	2	2		2	1	2	2	2	2	
35.	1	2	2	2	2	2		2	2	2	2	1	2	
36.	2	1	2	1	2	2		2	1	2	1	2	1	
37.	1	2	2	1	2	2		2	1	1	2	2	1	
38.	2	2	2	1	2	2		2	2	2	2	1	2	
39.	1	2	2	2	1	2		2	2	1	2	1	2	
*40.	1	2	1	1	2	2		2	2	1	2	2	2	

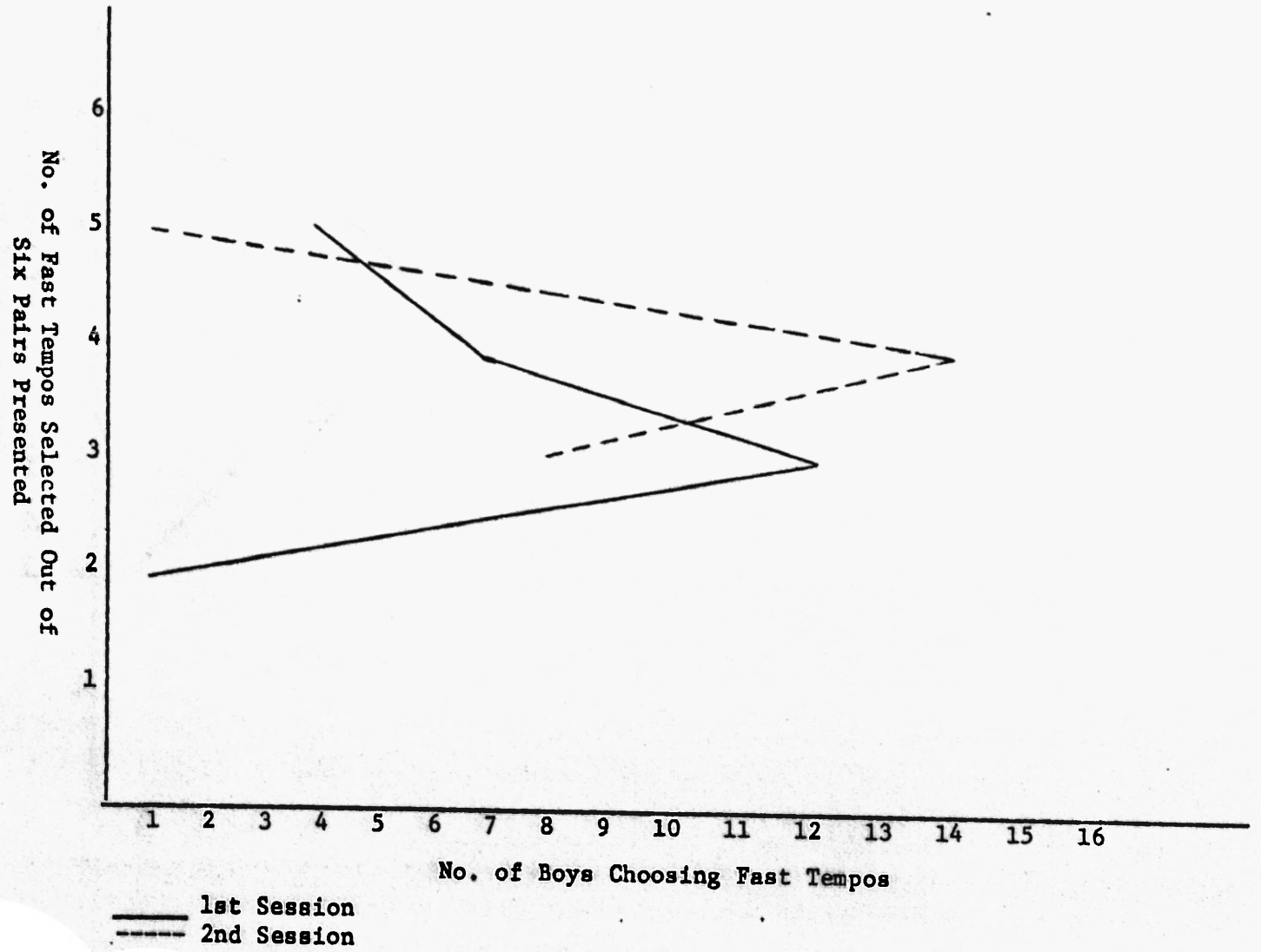
*Girls

APPENDIX D

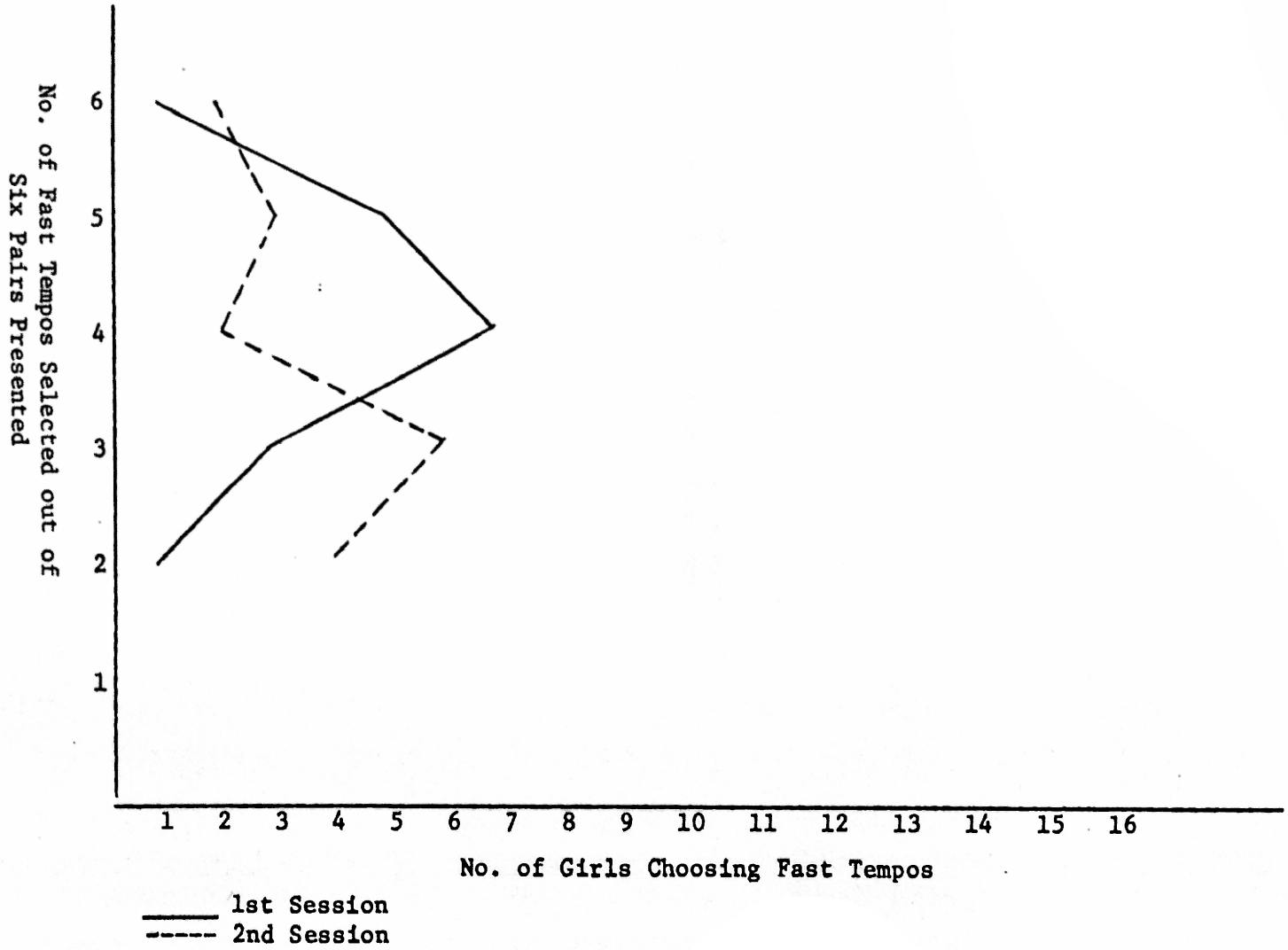
Graphs Showing Number of Fast Tempos Chosen From Six Presented Musical Pairs


NUMBER OF FAST TEMPOS CHOSEN FROM SIX PRESENTED MUSICAL PAIRS
No. of Subjects Choosing Fast Tempos
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
1st Session
2nd Session
6
5
4
3
2
1
No. of Fast Tempos Selected Out of Six Pairs Presented

NUMBER OF FAST TEMPOS CHOSEN BY BOYS FROM SIX PRESENTED MUSICAL PAIRS



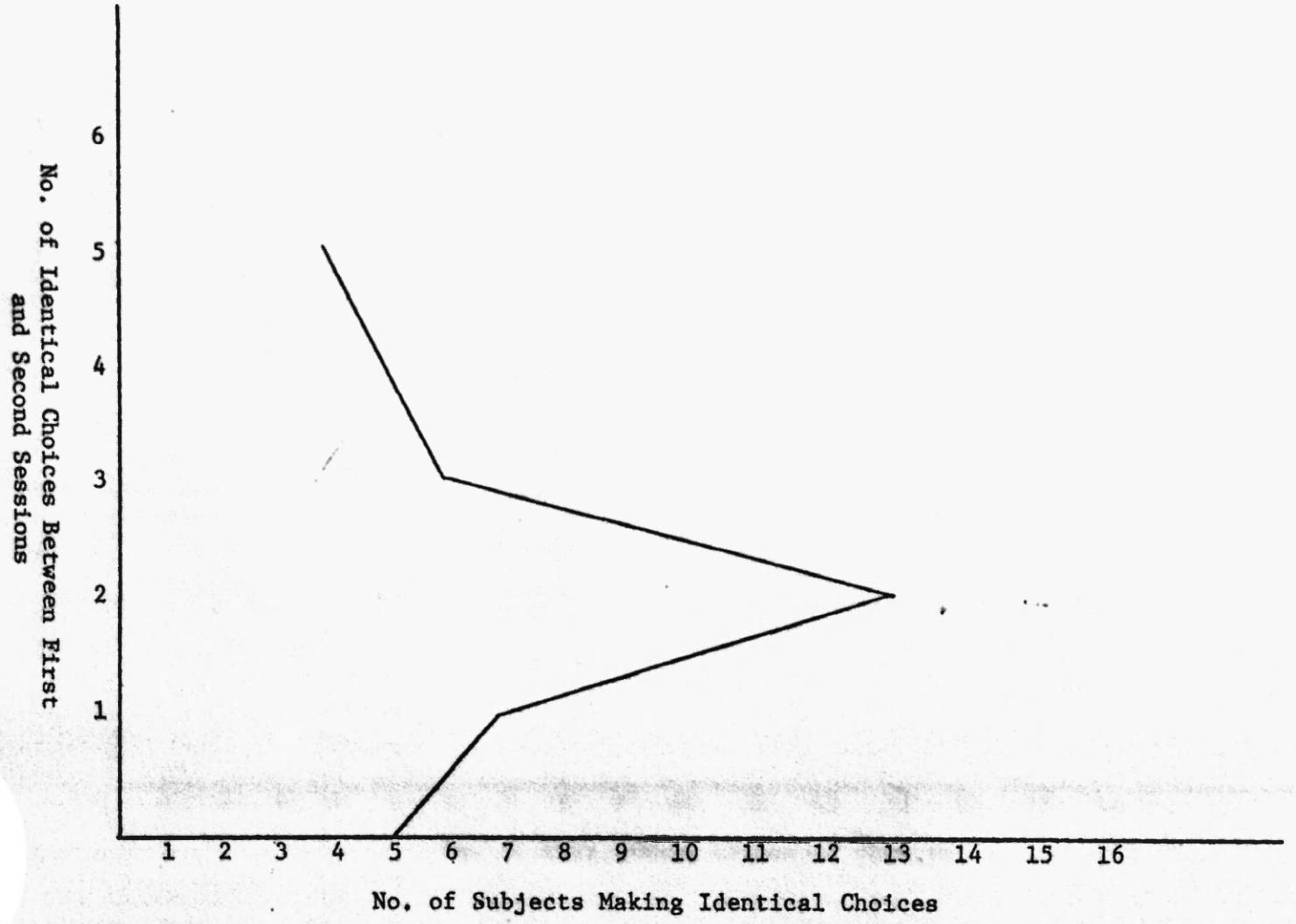
NUMBER OF FAST TEMPOS CHOSEN BY GIRLS FROM SIX PRESENTED MUSICAL PAIRS



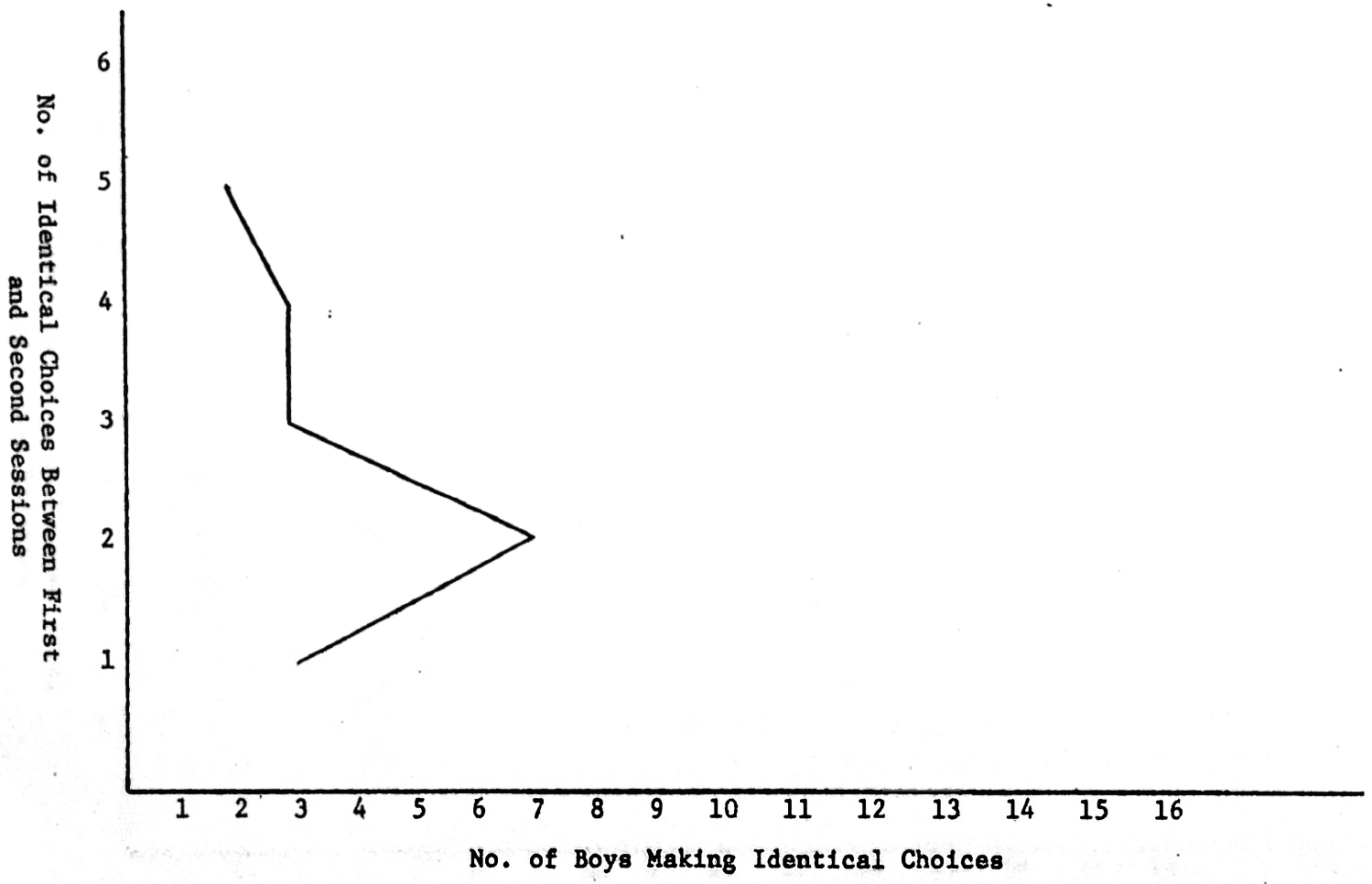
APPENDIX E

Graphs Showing Consistency of Choices Between First and Second Sessions

CONSISTENCY OF CHOICES BETWEEN FIRST AND SECOND SESSIONS



CONSISTENCY OF BOYS' CHOICES BETWEEN FIRST AND SECOND SESSIONS



CONSISTENCY OF GIRLS' CHOICES BETWEEN FIRST AND SECOND SESSIONS